Amendment to the Claims

1. (Currently Amended) A motion estimator of a video encoder, comprising:

a search region data memory for storing video data of a previous video frame;

a macroblock data memory for storing macroblock data of a current video frame;

a first sub sampling circuit for sub-sampling by ratio M:1 the video data of a previous frame read from the search region data memory in response to a sub-sampling rate control signal;

a data array circuit for arraying video data outputted from the first sub-sampling circuit so that motion vector estimation candidates can be outputted sequentially to a second sub-sampling circuit for sub-sampling, by ratio M:1, current video frame data read from the macroblock data memory in response to the sub-sampling rate control signal;

a macroblock measure circuit for receiving the current frame video data read from the macroblock data memory to calculate a sum of absolute differences (SAD) between a mean intensity of a macroblock and an intensity of each pixel of the macroblock;

a search region deciding circuit for outputting a search region decision signal based on the sum of absolute differences between the mean intensity of the macroblock and the intensity of the each pixel of the macroblock;

a processing element (PE) array network for sequentially calculating a SAD (sum of absolute differences) value of the data outputted from the first sub-sampling circuit and the search region data outputted from the data array circuit, according to the search region decision signal a designation of the search region decided by the search region deciding circuit, to sequentially output a plurality of SAD values;

a motion vector comparator for receiving the plurality of SAD (sum of the absolute differences) values sequentially outputted from the PE array network, and comparing theeach SAD value with a previous SAD value, to detect a minimum SAD value as a motion vector value.

2. (Cancelled)

3. (Currently Amended) The motion estimator as claimed in ~~21~~ claim 1, further comprising a comparator for selecting an intermode or an intramode based upon a comparison of the sum (A)

of the absolute differences between the mean intensity of the macroblock and the intensity of each pixel of the macroblock, with a predetermined threshold value.

4. (Currently Amended) The estimator as claimed in ~~21~~ *claim* 1, further comprising:

a controller for generating a sub-sampling rate control signal per each of upper, medium and lower steps to obtain a motion estimation, and an address to read and write the macroblock data and the search region data, and for receiving a motion vector value detected per each of the upper, medium and lower steps to output a motion estimation candidate designation signal; wherein the sub-sampling rate control signal of the upper step is a signal causing a 4:1 sub-sampling ratio.

5. (Currently Amended) The estimator as claimed in ~~21~~ *claim* 1, further comprising:

a controller for generating a sub-sampling rate control signal per each of upper, medium and lower steps to obtain a motion estimation, and an address to read and write the macroblock data and the search region data, and for receiving a motion vector value detected per each of the upper, medium and lower steps to output a motion estimation candidate designation signal; wherein the sub-sampling rate control signal of the medium step is a signal for causing a 2:1 sub-sampling ratio.

6. (Currently Amended) The estimator as claimed in ~~21~~ *claim* 1, wherein the macroblock measure circuit comprises:

an ~~AVG_MB~~ average calculating circuit for receiving the ~~current frame~~ macroblock data of the current frame and calculating the mean intensity value of the macroblock; and

a sum ~~(A)~~ calculating circuit for receiving the ~~current frame~~ macroblock data of the current frame and calculating the sum ~~(A)~~ of the absolute differences between the mean intensity of the macroblock and the intensity of each pixel of the macroblock.

7. (Original) The estimator as claimed in *claim* 1, wherein a ± 4 pixel search region for a 4x4 pixel block is operatively divided into four ± 2 pixel search regions, and the PE array network sequentially searches the four ± 2 pixel search regions to sequentially output the SAD values for the 4x4 pixel block within the ± 4 pixel search region.

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claim

8. (Currently Amended) The estimator as claimed in 1, wherein for performing a search for a 8x8 pixel block within a ± 2 pixel search region, the 8x8 pixel block is operatively divided into four 4x4 pixel sub-blocks, and the PE array network sequentially searches for each of the 4x4 sub-blocks within the ± 2 pixel search region and sequentially outputs four SAD values for each one of the 25 search points within the ± 2 pixel search region.

claim

9. (Original) The estimator as claimed in 1, wherein for performing a search for a 16x16 pixel macroblock within a search region, the 16x16 pixel macroblock is operatively divided into sixteen 4x4 pixel sub-blocks, and the PE array network sequentially searches for each of the 4x4 sub-blocks within the search region and sequentially outputs sixteen SAD values for each one of the search points within the search region.

10-20 (Cancelled).

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